

# NEWS

Volume 4 Number 3

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## **DMSO, Paramount collaborate to support ICAF's 'Final Flurry'**



Image courtesy of Paramount Digital Entertainment

By Sherrel Mock  
DMSO Public Affairs

In early June, Paramount Digital Entertainment (PDE) and the DoD's Defense Modeling and Simulation Office (DMSO) brought a new integrated multimedia way of training to the Industrial College of the Armed Forces (ICAF) at the National Defense University in Washington, DC, to support the ICAF's capstone exercise called "Final Flurry."

Final Flurry, an end-of-academic-year synthesis, is conducted as a five-day seminar-style event. The students, primarily senior military

and civil servants, are divided into approximately 20 seminar groups containing a heterogeneous mix of military and non-military expertise. Non-military participants are typically from the executive branch, including the Departments of State, Justice, Treasury, Transportation and Interior.

The StoryDrive Engine, a multimedia simulation tool developed with DMSO funding by PDE and the Information Sciences Institute (ISI) of the University of California (USC),

See **PARAMOUNT**, p. 8

## **M&S awards nominations open Oct. 1**

By Larry Alexander  
DMSO M&S Awards Project Lead

The nomination period for the 1999 DMSO Modeling and Simulation (M&S) Awards will open on Oct. 1 and close on Dec. 10. Winners will be announced at the DMSO Industry Days in June 2000.

Detailed nomination procedures and forms will be posted on the DMSO Web site at [www.dmsomil/awards/](http://www.dmsomil/awards/) prior to Oct. 1.

The awards program, now in its second year, was initiated in 1998 by the DMSO to recognize both government and non-government achievement in support of Department of Defense (DoD) M&S objectives. Eight in-

See **M&S AWARDS**, p. 5

See pp. 10-11 for photos of this  
year's DMSO M&S Awards winners.

# Director's Corner

By Col Crash Konwin, USAF

*"And you thought  
the three Rs were  
behind you..."*



Photo by Steve Wilson

As we all begin to spin up for the beginning of yet another fiscal year, assess our progress in the last and set our sites for the future, we should take a few minutes to reflect on some of the fundamentals of success. Although important, it is no longer sufficient to have succeeded in mastering "Reading, Riting, and Rithmetic." In this article we will borrow from the Random House Dictionary to gain insights into a more appropriate set of criteria from which to estimate the capabilities of our people and programs to reflect the qualities of Relevancy, Responsiveness and Resilience.

**Relevancy – appropriate, fitting or suitable.** Since the development and application of modeling and simulation (M&S) is advantaged by the tremendous growth in capabilities of information technology, yet limited by our understanding of the way the so-called "real world" works, we have to constantly remind ourselves to review our plans, programs and technology development efforts for relevancy. In the recent news, the Iridium satellite and communications project is perhaps unfairly singled out for being a high profile "failure" of the ability of the technical community to reflect and act on the myriad developments ongoing concurrently with the system's development and deployment. It appears that the system is meeting most if not all of its technical capabilities, and yet Iridium LLC is being reorganized under the protection of bankruptcy laws. While the

*"... Relevancy, Responsiveness  
and Resilience."*

functional capability of widespread mobile communications is still valued by a significant market, the options now available to satisfy that need have grown since the inception of the Iridium project – and under more favorable financial terms to the end user. It is said that experience is the best teacher – however, learning from the experience of others is generally a more beneficial and less stressful option. Perhaps the Iridium experience can motivate periodic reflection within your key projects assessing continued relevance in light of the rich array of options available.

**Responsiveness – responding or reacting readily to influences, appeals, efforts.** Can you honestly convince yourself and your seniors that the program you are responsible for is responsive to the needs of the warfighters and other senior decisionmakers? Even if the development period of your program or exercise takes an extended period of time, have you developed adequate ways to engage the interest of your customer and respond appropriately to the dynamics of a dynamic technology base and changing priorities or needs? Have you re-

See DIRECTOR'S CORNER, p. 3

## DMSO NEWS

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## From CAPT (Sel) Johnson ...

By CAPT (Select) Dave Johnson, U.S. Navy  
Chief, DMSO Operations Division



**I**t is a great and exciting time to arrive at the DMSO. As the new Ops Chief, I look forward to interacting with all of you and making a contribution to the Department of Defense and the modeling and simulation (M&S) community through my programs, which include the M&S Master Plan, the M&S Resource Repository (MSRR), Education, Outreach and NATO.

The DMSO is an interesting change for me. I've just graduated from the National War College (NWC) with a

degree in National Security Strategy. I'm pleased to have been selected for a joint billet in Office of the Secretary of Defense. Prior to attending NWC, I had the wonderful opportunity to command a Navy P-3 maritime surveillance squadron. In fact, I've flown airplanes for most of my Navy career. From those experiences, I bring an operational fleet perspective to the critical issues we, here in DoD, face.

Again, I look forward to the chance to meet many of you and the occasion to help the Department to embrace modeling and simulation as a cost-effective force multiplier.

Contact CAPT (Sel) Johnson at (703) 998-0660, or [djohnson@msis.dmo.mil](mailto:djohnson@msis.dmo.mil).

## From Capt Mosle ...

By Capt. William B. "Chip" Mosle III, U.S. Air Force  
Air Force Intern Program

In the last *DMSO News* Col Konwin wrote: "*Capt Chip Mosle, USAF is a recent addition to the DMSO team. During his six-month tenure at DMSO, he will be focusing on Simulation Based Acquisition (SBA). Specifically he will conduct a gap-analysis on the various service/component SBA policy and initiatives in the context of the OSD SBA vision.*"

**I** wanted to take this opportunity to introduce myself to the DoD modeling and simulation (M&S) community. My service career has been in test and evaluation (T&E) as a flight test engineer at Holloman and Edwards AFBs with the Global Positioning System (GPS) aircraft test, Air Force Test Pilot School, and F-22 flight test. From Edwards, I came to Washington with the Air Force Intern Program (AFIP). The AFIP is a professional development program combining hands-on experience in the Office of the Secretary of Defense, Joint Staff, and/or the Air Staff with academic graduate courses in leadership and management.

My M&S background has been integrating the benefits of M&S into the T&E domain, both with GPS and the F-22. I look forward to working with the DMSO and the greater team committed to implementing M&S to meet the warfighter's needs.

Capt Mosle has a BS in Electrical Engineering from Duke University, an MS in Electrical Engineering from the Air Force Institute of Technology, and an MA in Administrative Sciences from George Washington University.

Contact Capt Mosle at (703) 824-3442, or [wmosle@msis.dmo.mil](mailto:wmosle@msis.dmo.mil).

## Director's Corner

Continued from p. 2

membered to include adequate customer support processes and resources to sustain them as you get ready for transition to operational use so you can continue to complete/sustain development with concurrent testing and fielding?

### **Resilience – ability to recover readily from adversity.**

I recently presented the first of what is anticipated to be a recurring DMSO M&S spot award called the "Teddy Roosevelt" to the outgoing Chair of the Acquisition Functional Working Group, Ms. Robin Frost. Anyone who has been involved in the creation of the vision, roadmap or implementation plan of Simulation Based Acquisition, knows the difficulty of championing and furthering the opportunity for significant collaboration between Industry and the Department of Defense to reduce cycle time, reduce total cost of ownership and deliver outstanding products to the warfighters. Every day within this and many other M&S-related programs of significant scale and scope is filled with challenges, working the hard problems, striking compromises when able, and recommending positions that draw the lines in a fair manner. As Theodore Roosevelt said, the credit belongs to those who are "actually in the arena, whose faces are marred by dust and sweat and blood, who strive valiantly, who err and come up short again and again, because there is no effort without error or shortcoming, but who know the great en-

thusiasms, the great devotions, who spend themselves for a worthy cause; who, at best, know, in the end, the triumph of high achievement, and who, at worst, if they fail, fail while daring greatly, so that their place shall never be with those cold and timid souls who know neither victory nor defeat." We all need to appreciate his sentiment and internalize it within our teammates and ourselves – then strive to Make Something Happen!

Cheers,

Crash

**Professional Postscripts** – With the passing of the summer comes the inevitable hails and farewells to some of the leadership within the M&S community. In the training functional area: Council Co-Chairs — Brig Gen Richard Bundy, USAF, VJ-7, has replaced Brig Gen Pasini, USAF, VJ-7; Mr. Mike Parmentier, Director of Readiness, ODUSD(R) has replaced Mr. Thomas Longstreth, DUSD(R); Functional Working Group Co-Chair — COL Abe Turner, USA, J-7/JETD, has replaced CAPT Mike Duffy, USN. In the acquisition functional area: Council Chair — Mr. John Wilson, OUSD(A&T)/SA, has replaced Dr. Patricia Sanders, DTSE&E; Functional Working Group Chair — Mr. Joe Alberg, OUSD(A&T) SA/ASM has replaced Ms. Robin Frost, OD(TSE&E). I want to express my sincere thanks to each of you for the leadership and energy you've shown (or will show) in moving the Department forward in the challenge of leveraging the power of modeling and simulation for the warfighters.



## ***Guest's Corner***

# **ACOM J9 looking for key breakthroughs to ensure U.S. military superiority in 21st Century**

Major General Timothy A. Peppe, U.S. Air Force  
Director, Joint Experimentation (J9)

United States Atlantic Command

**I**n October 1998, per the direction of the Secretary of Defense, the U.S. Atlantic Command (USACOM) established a new directorate, J9, for the purpose of conducting Joint Experimentation. The goal of experimentation is to find key breakthroughs in doctrine, organization and/or technologies that will ensure U.S. military superiority in the 21<sup>st</sup> century.

On Thursday, July 15, USACOM held a dedication ceremony for the new Joint Experimentation Battle Lab in Suffolk, VA. This facility houses the J9 directorate offices and the Simulation Analysis Center.

Prior to the opening of the facility, J9 personnel were deeply involved with the design and execution of its first major experiment, J9001. This experiment is being conducted in partnership with the Institute for Defense Analyses (IDA)/Joint Advanced Warfighting Program (JAWP). It will run through the summer and is using the simulation facilities in the USACOM Joint Training, Analysis, and Simulation Center (JTASC), which is next door to the new J9 facility.

The J9001 experiment centers on an Attack Operations Against Critical Mobile Targets (AOACMT) concept, set in a 2015 scenario. This futuristic concept calls for a Critical Mobile Target (CMT) cell which can seamlessly reach across traditional Service boundaries to task/re-task sensor assets and to pair attack assets with critical targets. This first experiment has been narrowly scoped to only theater ballistic missile (TBM) targets. Perfect communications, perfect weather and a successful joint suppression of enemy air defenses (JSEAD) campaign were further scope-limiting assumptions.

A federation of the Synthetic Theater of War (STOW) and Simulation of the Launch and Attack of Mobile Enemy Missiles (SLAMEM) simulations is being used to support the human-in-the-loop (HITL) requirement and to provide the stimulation for the CMT cell personnel; Defense Advanced Research Projects Agency (DARPA) personnel on site and the resident JTASC staff have provided excellent support. Key insights are emerging from this

work and will set the stage for our work in FY00.

Concurrently, the J9 is gaining insights into key concept areas through the leveraging of other experiments being run by the Services and Combatant Command Commanders-In-Chief (CINCs). J9 collects and analyzes data from these events frequently in a non-intrusive manner and sometimes by "buying-in" in key areas of Joint interest.

Throughout the year, a series of seminars, workshops and wargames are held to investigate concepts in the far future (for example, biocentric and autonomous warfare)



and to develop and refine concepts with subject matter experts (SMEs) prior to setting experiment objectives.

While our beneficial relationship with IDA/JAWP will continue into FY00 and beyond, next year will see a change in our experimentation strategy. While AOACMT will be the primary focus, we intend to take the key insights from J9001, increase the target set to include mobile surface-to-air missiles (SAMS) and examine the concept under a less than perfect operating environment. This major experiment, J0019, will be supported with the closed-form federation of simulations called Pegasus. Pegasus consists of the Service-nominated simulations – Eagle, Naval Simulation System (NSS), and the Extended Air Defense Simulation (EADSIM). The Defense Modeling and Simulation Office (DMSO) is assisting J9 in preparing the federation for this experiment. Leading up to J9001, J9 will host a series of seminars, workshops and wargames whose purpose will be to refine the concepts for the summer experiment.

Another major experimentation venue in FY00 is the leveraging of the four live Service

events scheduled in August/September — the Army's Joint Contingency Force Advanced Warfighting Experiment (JCF-AWE), the Navy's Fleet Battle Experiment-Hotel (FBE-H), the Air Force's Joint Expeditionary Force Experiment 00 (JEFX 00), and the Marine Corps' extended littoral battlefield experiment, CAPABLE WARRIOR.

In early FY00, the J9, with the Joint Warfare Analysis Center (JWAC) and the Joint Non-Lethal Weapons Directorate (JNLWD), and supported by the JTASC, will conduct a limited objective experiment using the Joint Conflict and Tactical Simulation (JCATS). The thrust of the analysis will look at the use of non-lethal weapons in a current day, coercive campaign scenario.

A major contributor to experimentation efforts will be the new Joint Theater Attack Analysis Center (JTAAC) branch of J9 located at Kirtland AFB, N.M. This group brings extensive experience in the analysis of AOACMT-related issues to the J9 efforts on this concept.

By FY01, the J9 will be fully resourced and staffed, making possible an aggressive experimentation battle rhythm. Two major simulation-based events are planned each year beginning in 2001: (1) a constructive simulation-based experiment to allow for multiple runs and rapid analysis of key components of concepts and (2), a virtual simulation-based experiment with HITL and

See **PEPPE**, p. 5

Maj Gen Peppe is the Director, Joint Experimentation (J9), United States Atlantic Command. He recently completed a tour as commander, 31st Fighter Wing, Aviano Air Base, Italy. Flying the only permanently assigned U.S. Air Force fighter aircraft in the North Atlantic Treaty Organization's Southern Region, the wing conducts and supports air combat operations in the European Southern Region, and maintains munitions for use as tasked by NATO and national authorities. The general was also responsible for the operations of U.S. Air Force, Marine Corps, Navy, Air Force Reserve, Air National Guard, British and Spanish aircraft flying from Aviano under the 31st Air Expeditionary Wing.



# Pegasus federation demonstrated at dedication of ACOM J9 building July 15

By Dave Seidel  
DMSO HLA Cadre

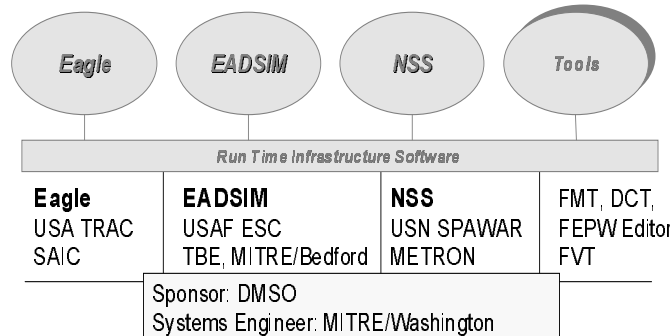
On July 15<sup>th</sup>, the Joint Experimentation Directorate, J9, of the United States Atlantic Command (USACOM, or ACOM) held a ribbon-cutting ceremony to dedicate its new state-of-the-art facility. The ceremonies provided an opportunity for ACOM to demonstrate the Pegasus federation, one of the newest additions to the Joint Experimentation toolkit. LTG Thomas N. Burnette, Jr., U.S. Army, Deputy Commander in Chief of ACOM, Maj Gen Timothy A. Peppe, U.S. Air Force, Director of Joint Experimentation for the command, and a host of local and visiting dignitaries were among the attendees who came to view the Pegasus demonstration.

Joint Experimentation is one of the primary methods for exploring, testing and validating future joint operational concepts that will drive changes to doctrine, organization, training and education, material, leadership and people. It is necessary to identify and assess those interdependent areas of Joint warfare that will leverage Service capabilities to transform the conduct of future US Armed Forces operations. The J9 has been assigned the responsibilities of Executive Agent within the Department of Defense for Joint Experimentation. From the beginning, it has been clear that modeling and simulation (M&S) would play an integral role in addressing experimentation requirements.

The Defense Modeling and Simulation Office (DMSO) has joined in a partnership with ACOM to provide M&S guidance and expertise. To

foster that cooperation, DMSO initiated an effort to create a High Level Architecture (HLA) federation appropriate to ACOM's experimentation needs—it joined analytic simulations from each of the Services with DMSO-developed tools to create the Pegasus federation. The federation proved its capability to support analysis and experimentation in FY98.

Pegasus consists of three analytic simulations – the Air Force provided the *Extended Air Defense Simulation* (EADSIM), the Army provided *Eagle*, and the Navy provided the *Naval Simulation System* (NSS). As the ACOM experiment objectives become better defined, the HLA federation approach allows several M&S alternatives, ranging from using more functions in the existing models, integrating new models, integrating command and control systems, or integrating human-in-the-loop simulators. The federation of simulations that is applied to the ACOM experiment will be designed to meet ACOM's ob-



jectives.

The ACOM J9 recently embraced Pegasus to examine attack operations against critical mobile targets like tactical ballistic missiles. Since Pegasus was intended to be a "persistent" federation from the onset, its re-use in this situation is an example of the value of HLA-compliant simulations in addressing recurring, but distinct, requirements. The DMSO is working closely with the J9 Integrated Product Team (IPT) to focus the Pegasus experiment.

## Peppe

Continued from p. 4

a limited set of trials to discover a concept's effect on human decision makers.

In 2004, the J9, with the Services, will conduct the first Joint, live integrating event. This experiment will seek to field test the complex concepts under development today. Major live, integrating events are envisioned to occur every 18-24 months from that time onward.

The support and guidance of the DMSO during these early years is critical to our success. Their efforts to establish the High Level

Architecture (HLA) will allow Joint Experimentation to construct federations of simulations and models that are designed to fit our experiment objectives which vary by concept. For this reason, we in J9 are fully committed to the HLA.

In the future, I envision using both the Joint Warfare System (JWARS) and the Joint Simulation System (JSIMS) to support our experiments. Until then, HLA-complaint, legacy simulations will be carefully selected and federated by experiment event to support our analytical needs. Looking to the far future in modeling and simulation, J9 is partnering with the DARPA to jump start research in several complex technology areas.

## M&S Awards

Continued from p. 1

dividuals or teams – one government and one non-government – are selected in each of four categories. The first three categories consist of the M&S functional areas – training, analysis and acquisition. The fourth category, a cross-functional area, considers those broader endeavors that impact all aspects of the overall DoD M&S effort.

Nominations in the functional areas will be reviewed by awards boards established by the

corresponding functional area councils of the DoD's Executive Council for M&S (EXCIMS). A select subcommittee of the M&S Working Group (MSWG) will review nominations in the cross-functional area. To ensure an equitable representation in the non-government sector, selected members of the M&S Industry Steering Group (ISG) will participate in the selection process. Finally, the EXCIMS, chaired by, Dr. Delores M. Etter, Deputy Under Secretary of Defense for Science and Technology, will review the various groups' recommendations for approval of the awards.

The 1998 DMSO M&S Awards were presented June 2 at the DMSO Industry Days, in Vienna, Va. See pp. 8-9 for photos of the winners. Visit [www.dmsomil/awards/1998/](http://www.dmsomil/awards/1998/) for detailed descriptions of the winning projects.

For more information visit the DMSO Web site at [www.dmsomil/awards/](http://www.dmsomil/awards/) or contact:

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# DoD M&S education project celebrates 2 years

By Tom Stanford  
DMSO M&S Education Project Lead

*"This course should be mandatory for new folks in M&S."*

*"One of the best courses I have ever been to."*

*"Excellent course. Perfect for someone like me with minimal M&S knowledge. Highly recommend."*

These are a small sample of the many accolades from people throughout the DoD who have attended one of the Defense Modeling and Simulation Office's (DMSO) M&S familiarization courses. So, what are these courses, how did they come about, and—most importantly—how can you participate?

As recently as two years ago, the DoD M&S Education Project existed only as a DMSO vision. There were no products, students, alumni, and no clear strategy for providing for the education needs of the M&S community. What a difference two years makes! From the vision arose a strategy, an execution plan, thousands of attendees participating in a wide variety of familiarization courses, and a revitalized education subgroup of the M&S Working Group. In two short years the DMSO has moved from talking about it to the forefront of the M&S education scene.

To get a better idea of what courses are available, visit the M&S Education Web site at <http://www.education.dmsi.mil/>.

Here's what we've accomplished and what's available.

**M&S Staff Officer Course (MSSOC).** The five-day MSSOC, flagship of the M&S Education Project, targets newly assigned personnel with little or no M&S experience. The MSSOC provides a broad familiarization with M&S policies, organizations, programs, activities, issues and key players. MSSOC alumni, numbering almost 700, include military, DoD civilian, DoD contractors, and allies from across the M&S functional areas of training, acquisition and analysis. The MSSOC has been conducted 20 times since it made its debut in the summer of 1997. Presented quarterly at the DMSO, it has also been presented in California, New Mexico, Florida, Kansas, Hawaii, Korea and Germany.

For a schedule of MSSOC courses or to register visit the M&S Education Web site. Click on "MSSOC" and scroll down the page to the registration area. Currently, there is no registration fee.



**DMSO M&S Education project instructor, Denny Murphy, presents Lois Yu, guest speaker at MSSOC 99-4, in San Diego, June 7-11 with a DMSO cup. Yu spoke on the "Naval Simulation System (NSS) High Level Architecture (HLA) Integration Framework."**

**MS 101.** MS 101 is a half-day tutorial that offers the highlights of the MSSOC—an "MSSOC's Greatest Hits." MS 101 made its debut at the Industry and Interservice Training, Simulation and Education Conference (IITSEC) in Orlando in December 1998 to approximately 600 attendees. Since then, it has been presented to audiences at the Naval Postgraduate School, Marine Corps Systems Command (MARCORSYSCOM), DMSO's Industry Days, the Korea Institute for Defense Analysis, U.S. Special Operations Command (USSOCOM), the Army's Military Education Level (MEL) 1 program at the University of Texas, and others. MS 101 is the ideal presentation for those who need a familiarization course, but do not have the resources to spend a week at the MSSOC.



**Allied students Jan Propeck, Canada, and Jan Gesau, Germany, talk during MSSOC 99-4.**

**Program Management Office (PMO) M&S Workshop.** The PMO M&S Workshop team has been busy. Although still under development, interest is high for this one-day workshop that assists the Program Manager and his/her staff in planning for the use of M&S throughout the product lifecycle. Taught on location and targeted specifically toward the PM's staff, the Workshop provides DoD M&S information, tools the PM staff can use, and sources of M&S information. The PMO M&S Workshop has been presented to Service acquisition and M&S office representatives, faculty members from the Defense Systems Management College, industry representatives, the Marines' Advanced Amphibious Assault Vehicle (AAAV) Program Office and at MARCORSYSCOM at Quantico, Va. Coordination with several other program offices is ongoing.

**NATO M&S Orientation Course (NMSOC).** Development of course materials for this U.S. Voluntary National Contribution to executing the NATO M&S Master Plan is underway. Several tests of the materials will be tested with international audiences this fall. The course should be ready for the NATO audience this winter. This course presents a unique challenge in that M&S is presented from a different viewpoint—from the NATO perspective, using NATO country examples.

The DMSO M&S Education Project is for those who need to learn about M&S in the U.S. Department of Defense. Visit the M&S Education Web site at <http://www.education.dmsi.mil/>, or contact Navy CAPT (Select) Dave Johnson, DMSO Chief of Operations, [djohnson@msis.dmsi.mil](mailto:djohnson@msis.dmsi.mil), (703) 998-0660, or Tom Stanford, M&S Education Project Lead, [tstanfor@msiac.dmsi.mil](mailto:tstanfor@msiac.dmsi.mil), (703) 933-3343.

# Progress continues on establishment of NATO Modelling & Simulation Groups

By Leon Armour

DMSO International Relations

The North Atlantic Treaty Organization (NATO) continues to make progress in establishing the NATO *Modelling and Simulation Group* (NMSG) and the *Modeling and Simulation Coordinating Office* (MSCO).

The NMSG is the senior-level body responsible for the coherent management and coordination of modeling and simulation (M&S) activities across the Alliance and oversees the MSCO, which manages the day-to-day M&S activities in NATO. The NMSG reports to the NATO Research and Technology Board (RTB), which in turn reports to the Conference of National Armaments Directors (CNAD) and the Military Committee (MC).

The NMSG met for the second time at NATO Headquarters in July. The Group developed a *Programme of Work* for the NMSG and the MSCO, funding requirements for 2000 and 2001 for common services, and agreed to an organizational structure that divides the Group's *Programme of Work*

between three committees, or subgroups – Executive, Planning and Special Projects. An early September meeting of the Planning and Executive committees in London finalized the *Programme of Work* and the 2000/2001 budget that will be briefed by the NMSG Chairman, U.S. Air Force Col Kenneth "Crash" Konwin, to the RTB in Warsaw, Sept. 21-24.



Stand-up of the MSCO continues. Resolution of staffing, office space and funding issues is on going. The United Kingdom nominated Mr. G. Burrows to head the MSCO. Nominated by Spain, LCDR G. Ameyugo has been approved for the Deputy Head, MSCO. Other Nations are responding they will provide Voluntary National

Contributions (VNCs) to support MSCO staffing.

Planning is nearing completion for the first *NATO M&S Conference*. This Research and Technology Agency (RTA) and NMSG co-sponsored conference will take place at the Clarion Hotel in Norfolk, Oct. 27-29. The conference will present a series of papers in plenary sessions designed to educate attendees on the NATO M&S Master Plan and simulation policy, and to highlight new M&S activities within the Alliance. The NMSG will also hold its next meeting during the two-day conference.

The NATO M&S Conference will be held in conjunction with *International Modeling and Simulation (IMS) Week* in Norfolk, an event co-sponsored by Old Dominion University (ODU) and Supreme Allied Command-Atlantic (SACLANT). The IMS Week will include a Partnership for Peace (PfP) Education and Training Conference, Oct. 25-26; an Industry Exposition and Seminar Series, Oct. 26-28; and the NATO M&S Conference.

## DiMuNDS 2000 team meets to develop FOM

By Rich Briggs

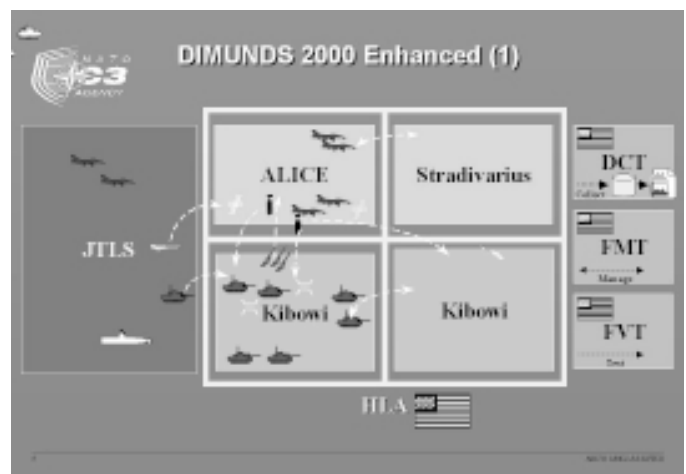
DMSO HLA Cadre

The Distributed Multi-National Defense Simulation (DiMuNDS) 2000 pre-Pathfinder project conducted a meeting to begin development of the Federation Object Model (FOM) in late August at the NATO Consultation, Command and Control Agency (NC3A) facility in The Hague, The Netherlands.

Technical representatives for each of the simulations and tools, and the federation manager participated to define the data elements that will be shared between the systems. The August meeting was scheduled after a successful meeting in June that was hosted by the U.S. Defense Modeling and Simulation Office (DMSO) where the federation objectives and the conceptual model were defined and agreed upon.

The June meeting formalized the federation objectives and federation constituents with Letters of Agreement (LOAs) from each of the participating nations. The LOAs were signed by each participating nation's Defense ministry and provided to the Chairperson of the NATO Multi-national Working Group (MNWG) on Interoperability of Operational Environment Simulations. The working meeting focused on defining the conceptual model of the federation. The conceptual model defines the range of simulated units, their attributes and the behaviors that are necessary to meet the users' objectives within the simulated context.

The objective of the DiMuNDS 2000 federation is to build skills within the NATO community in High Level Architecture (HLA) federation development while developing a multi-national system that ultimately can be leveraged in the NATO Pathfinder activity to support the training of the Command staff, Combined-Joint Task Force (CJTF). To



achieve this objective, the HLA Federation Development and Execution Process (FEDEP) document is being used as a guide. The FEDEP describes the set of activities that would typically occur during the lifecycle of a federation project. Since the development of NATO federations may require some additional activities that have not been encountered in previous federations, the lessons learned in this project will be fed back into the FEDEP documents.

See *DiMuNDS 2000*, p. 8



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## DiMuNDS 2000

Continued from p. 7

The conceptual model was first developed based on the breadth of representative operational requirements that would be required of the CJTF. Based on the high-level definition of the requirements the team compared the capabilities of the simulations that were available to define the operational requirements that could be supported with the system and within the project schedule. This subset of requirements was the foundation for defining the federation system requirements, scenario and the corresponding roles and responsibilities of each federate. The scenario is primarily a peacekeeping operation with some light warfare for suppression of hostility. There are four phases of activity:

*Phase 1:* Crisis build-up with limited air and ground activity, intelligence collection, movement and deployment of forces based on threat and intentions, and force protection

*Phase 2:* Creation of safe havens, activation of a humanitarian aid program, activation of a sea and air embargo

*Phase 3:* Implementation of a demilitarized zone, enforcement of a no-fly zone and a no-weapons zone

*Phase 4:* Support and protect the return of refugees, prepare and execute the withdrawal of forces

Each federate's responsibilities were defined based on the requirements and the scenario. A graphical depiction of the allocation of responsibilities to each federate is shown in Figure 1 (p. 7).

The August FOM development meeting built upon the previous work to define the set of object attributes and interactions that must be represented and exchanged within the federation to support the scenario, and thus the operational and federation requirements. This definition process requires participants that understand the details of each simulation to ensure that the appropriate information is exchanged and that the intended behavior is possible. The FOM development is an iterative process where the definitions are made then implemented and refined until the system is operational. After the FOM is developed, federate developers will begin to integrate their simulations with the HLA Runtime Infrastructure (RTI) and implement the required changes to conform to the FOM.

For more information contact Rich Briggs, (703) 658-7960, [rbriggs@virtc.com](mailto:rbriggs@virtc.com), or read the paper, "Experiences in the NATO pre-Pathfinder DiMuNDS 2000 Federation," (number 99F-SIW-189) from the proceedings of the Fall 1999 Simulation Interoperability Workshop. The paper can be downloaded at <http://siso.sc.ist.ucf.edu/siw/99Fall/rpts-papers.htm>.

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## Enviro Fed

Continued from p. 13

federation, so the federate teams are familiar with the HLA concepts and the Runtime Infrastructure (RTI) software. According to Dr. Birkel, "The Environment Federation demonstrates that complex environmental

processes can be modeled by individual federates, and that resulting environmental data updates can be effectively and efficiently delivered to many classic combat simulations. The RTI is the obvious means for delivering the data in a modern distributed simulation."

Widespread and consistent use of the HLA and SEDRIS should raise the bar for DoD modeling and simulation (M&S), making

more realistic portrayal of diurnal (night and day), combat engineering and weather effects (among many examples) feasible and affordable for all M&S applications. Recent world events have shown that combat doesn't always occur on a cloudless, sunny day. As Dr. Birkel points out, "We can't afford to train our troops or test our weapon systems under only those conditions."

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## Paramount

Continued from p. 1

supported and augmented the basic exercise scenario developed by the ICAF faculty.

"In the StoryDrive experience the students are like a movie audience with the teacher as the director," according to Larry Tuch, the PDE representative responsible for integrating the StoryDrive Engine into the ICAF's exercise. "He can orchestrate story events by sending the students e-mail, voice mail or electronic video mail, and specific information in the form of television news clips, briefing documents, maps and intelligence reports. But, of course, this is more than a movie. It's a simulation. And that means the students also have the power to react to and (affect) the direction of the story."

The story included context, characters and plot points for four fictitious crises in the world in the year 2010. Story and character were key according to the PDE team. Video and audio were the means to help students get to know the characters. But it was the characters and the story that drew the participants into the event and created a compelling feeling that it was 2010 and that the crises were real.

"StoryDrive is designed to increase the effectiveness of simulation training by combining compelling stories and well-rounded characters and building them into an interactive framework," Tuch said. "This framework connects teacher and student to the simulation environment via networked laptop computers. And it allows the teacher to control the simulation scenario — right from his laptop. As a result, the scenario unfolds, moment by moment, on the students' laptops."

Along the way the Final Flurry seminar group was presented with a set of problems to address, ranging from taskers from a fictitious National Security Advisor to briefings to the press. The faculty seminar leader used the products generated by the seminar group to steer the next day's story. He controlled the training event by steering the seminar group away from one crisis and toward another as he saw fit.

The genesis of the DMSO's two-year collaboration with PDE comes from recommendations by the National Research Council's (NRC) Computer Science and Telecommunications Board in its 1997 report, "Modeling and Simulation — Linking Entertainment and Defense," and Paramount's proposal to then-Director of Defense Research and Engineering, Dr. Anita Jones, to work with the DoD. The DMSO, which requested the NRC "to evaluate the extent to which the entertainment industry and DoD might be able to leverage each other's capabilities in modeling and simulation technology and to identify potential areas for greater collaboration," saw the support to the ICAF's Final Flurry exercise as a good first opportunity to follow through on the NRC's recommendations and test the viability and cost effectiveness of multimedia in training.

The DMSO is the focal point for modeling and simulation (M&S) activities within the DoD. The office is a technology transition and support organization charged with maximizing efficiency and effectiveness of M&S efforts across the Department and fostering interoperability and reuse among the DoD's models and simulations.

Additional information outlining the collaboration of the DMSO, Paramount and the ICAF is available in a PowerPoint presentation downloadable from the DMSO FTP site at <ftp://msis.dmsi.mil/incoming/>. Select the file *paramount.ppt*.



# DMSO Conference Participation

As the focal point for DoD modeling and simulation (M&S) the DMSO will participate in a number of M&S-related conferences and workshops during the next year as part of an overall outreach program to inform, educate and communicate with the M&S community, both nationally and internationally. The following conferences are planned for participation, either through attendance by selected DMSO representatives; presentation of papers, briefings, tutorials and special sessions; or presentation of exhibits and technical demonstrations.

For conference details visit the M&S Calendar at <http://www.msiac.dmsi.mil/mscalendar/>.

## SEPTEMBER '99

13-17 Fall SIW, Orlando (Exhibit, demos)  
20-23 ITEA Annual Symposium, Atlanta, GA

## OCTOBER '99

22-23 DiS-RT, Greenbelt, MD  
25-29 Defense Analysis Seminar X (DAS-X), Seoul, Korea  
27-29 NATO M&S Conference at SACLANT/ODU Int'l M&S Week, Norfolk, VA  
29-30 US-ROK M&S Workshop, Seoul, Korea

## NOVEMBER '99

1-2 ITEC Asia '99, Seoul, Korea (Exhibit)  
29 Nov-2 Dec IITSEC, Orlando (Exhibit, demos)

## DECEMBER '99

5-8 WinterSim Conference, Phoenix, AZ  
6-9 ITEA M&S Workshop, Las Cruces, NM

## FEBRUARY '00

27 Feb-2 Mar SimTecT 2000, Sydney, Australia

## MARCH '00

26-31 Spring SIW, Orlando. FL

## APRIL '00

11-13 ITEC Europe, The Hague, The Netherlands (Exhibit)

## MAY '00

Week of 22 May DMSO Industry Days at the Sheraton Premiere, Tysons Corner, Vienna, VA (Exhibit, demos)

## JUNE '00

20-22 68th MORS Symposium, USAF Academy, Colorado Springs, CO

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### Looking for a Date?



Need the dates, registration information, a point of contact, or the web site for an upcoming M&S conference, but don't know where you put the brochure?

Check the new  
"M&S Calendar"  
at  
<http://www.msiac.dmsi.mil/mscalendar/>

### ASK DMSO

• [ASK\\_DMSO@msis.dmsi.mil](mailto:ASK_DMSO@msis.dmsi.mil) •

Have a question about the DMSO, but don't know who to call? Send your query to [ASK\\_DMSO@msis.dmsi.mil](mailto:ASK_DMSO@msis.dmsi.mil). We'll sort it out and get you an answer.

### DMSO M&S Awards

The nomination period is Oct. 1 through Dec. 10.

See p. 1 for more information, or visit the [www.dmsi.mil/awards/](http://www.dmsi.mil/awards/).



See p. 2 for instructions for receiving an e-mail version of the DMSO News each quarter.

# ***DMSO Awards for Outstanding Achievement***

# ***1999***

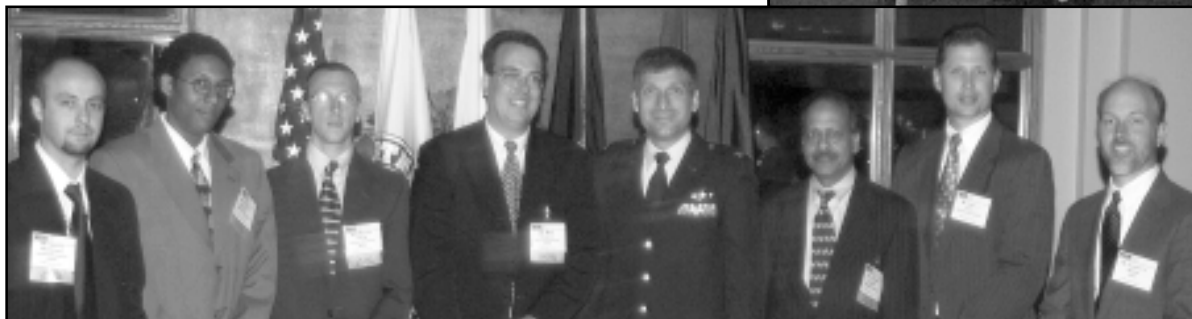
## **Acquisition Category**

### **GOVERNMENT TEAM**

Joint Strike Fighter Virtual Simulation Based Acquisition Team  
Air Force Research Lab, Wright-Patterson AFB, Ohio

### **NON-GOVERNMENT TEAM**

Advanced Amphibious Assault Vehicle M&S IPT  
General Dynamics Corporation, Woodbridge, Va.



### **NON-GOVERNMENT TEAM**

Knowledge Acquisition Team  
Veridian Corporation, Arlington, Va.



### **GOVERNMENT INDIVIDUAL**

Major Stephen K. Iwicki, US Army  
HQ US Army,  
Deputy Chief of  
Staff for  
Intelligence  
Washington, DC  
(Major Kyle Rogers  
pictured accepting  
award for Major  
Iwicki)



## **Training Category**

Visit the DMSO Web site at [www.dmsomil.com](http://www.dmsomil.com) for  
descriptions of the winners' projects and  
submitting nominations for the competition.

# Advancement in Modeling and Simulation



Photos by Steve Wilson

## Analysis Category

### **GOVERNMENT TEAM**

Joint Warfare Analysis Center Military Logistics Branch  
Joint Warfare Center, Dahlgren, Va.



### **NON-GOVERNMENT TEAM**

Joint Warfighting  
Program Trailblazer  
Federation  
MITRE, McLean, Va.



### **GOVERNMENT TEAM**

Rock Drill Team  
US Army Logistics Integration Agency, Alexandria, Va



### **NON-GOVERNMENT TEAM**

Synthetic  
Environment Data  
Representation and  
Interchange  
Specification  
(SEDRIS) Team  
US Army  
Simulation,  
Training &  
Instrumentation  
Command  
(STRICOM),  
Alexandria, Va.



## Cross-Functional

[www.dmsomil/awards/](http://www.dmsomil/awards/) for detailed  
facts. See p. 1 for information on  
current competition.

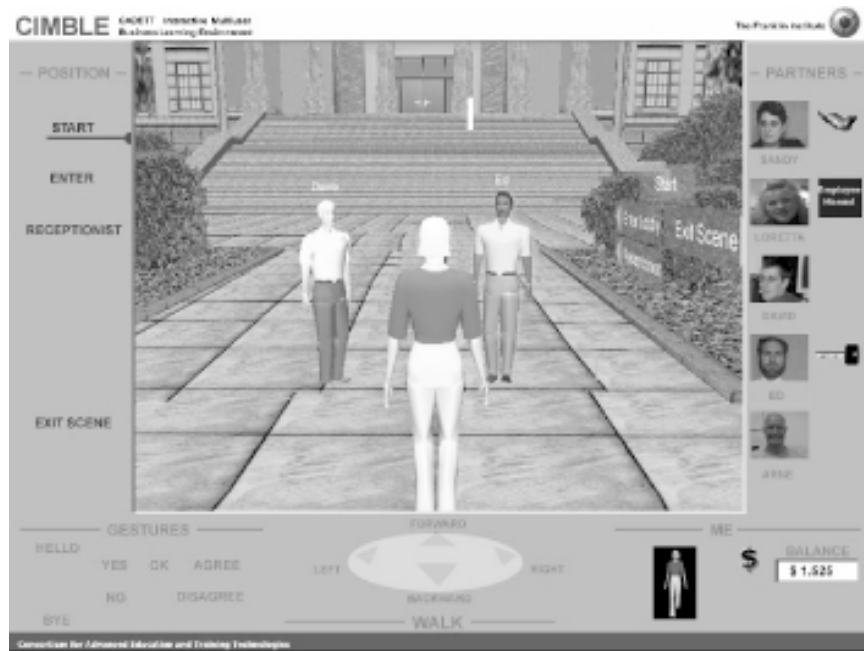
Alexandria, Va.

## DMSO, Franklin Institute seek new technology to facilitate distributed learning, team building

By Dave Seidel  
DMSO HLA Cadre

The Defense Modeling and Simulation Office (DMSO) is sponsoring the development of new technology to facilitate distributed learning. To accomplish this, the DMSO formed a partnership with the Consortium for Advanced Education and Training Technologies (CADETT), managed by The Franklin Institute in Philadelphia, Pa. The CADETT is developing an

A sample team-building exercise was developed to evaluate how well the CIMBLE technology worked for learning. It tasks six participants from "StarBridge Corporation" and a facilitator to journey to a distant construction site and resolve issues that have prevented the completion of a bridge. Participants must use their communication and decision-making skills to accomplish the task.



application called the CADETT Interactive Multi-user Business Learning Environment, or CIMBLE, to facilitate distributed learning and teambuilding in the workplace.

The CIMBLE is based on the principle that teams are built through coordination and cooperative problem solving, and that these activities can be accomplished remotely if the system that integrates the participants is engaging, robust and believable. To test this theory, the CADETT is developing a system that emphasizes the learning and practice of "soft skills" like communications and decision making.

The CIMBLE's technology brings virtual participants together using virtual interactions – team members work with one another using workstations and the Internet. Each team member is represented by an avatar, a computer representation of himself. The avatars move, turn their heads and gesture in response to commands from their respective team members. On their workstation screens, team members see their environment and avatars representing other team members; but they only see what their own avatar would see based on where they are standing. The CIMBLE is designed to allow participants to talk to other team members through microphones and speakers on their workstations.

The current version of the CIMBLE uses the High Level Architecture (HLA) as the underlying infrastructure to coordinate activities. It is based on a version using client-server architecture. One of the goals of the HLA implementation was to identify and overcome shortcomings and limitations of the client-server implementation. The development team believes that HLA technology will result in faster response times, more versatile user screens and controls, more efficient communication among software elements, a more streamlined software development process and a product that is easier to adapt to new challenges.

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# ***DMSO encouraging formation of regional HLA User Groups to better support M&S community***

By Mike Lightner and Burt Upchurch  
DMSO HLA Outreach

To support the growing use of the High Level Architecture (HLA), the Defense Modeling and Simulation Office (DMSO) is encouraging the formation of regional HLA Users Groups. With the continuing acceptance and adoption of the HLA throughout the modeling and simulation (M&S) community, the idea has already taken root with users groups forming in Boston, the Tennessee Valley, the Florida High Tech Corridor, San Diego, Colorado Springs and the Washington, DC, area. The idea is expected to spread to the international community as well.

From its early development through today the HLA has always focused on the HLA user. Issues and recommendations on HLA standards have always come from the HLA user community. The HLA User Groups will not only continue this tradition of user focus, but will expand the HLA user community by inviting participation outside the traditional Defense community, thus facilitating a wider understanding of the HLA and fostering broader technical discussion and feedback.

While the DMSO actively supports the formation of regional HLA User Groups, it will not manage their activities. Each user group will take on a personality of its own, derived from the local membership's desires and needs. Seen as a natural extension of the DMSO's HLA outreach program, the DMSO

will make available expert speakers, focused training, lessons learned, and pointers to a broader set of information and insights.

The user groups will provide members with opportunities to share a common understanding of theories, practices, resources and experiences related to the HLA, as well as other important areas for achieving interoperable and reusable M&S, like conceptual modeling of the mission space and data standardization. Members can use the open forums to:

- Share experiences, lessons learned, needs, recommendations and concerns associated with the HLA, models, simulations, tools, components, techniques, products and services
- Influence evolving community-wide M&S standards and practices
- Discuss technical, management and user requirements/issues necessary to facilitate interoperable and reusable M&S

Current HLA Users Groups indicate they will act as "success sharing" technical forums. They also plan to introduce tools and techniques to the user community and to capture local HLA users' concerns and recommendations. Membership is open to any simulation professional interested in M&S reuse and interoperability. Current and forming groups ask members to participate by surfacing issues, lessons learned, conducting demonstrations and, perhaps, occasionally hosting a User Group meeting.

A User Group "Starter Kit" is available for anyone seeking to form an HLA User Group in their local area. The Starter Kit contains an invitation letter, a draft User Group charter, a draft policies and procedures document and a PowerPoint slide presentation.

For more information or to obtain a User Group Starter Kit contact Robert "Burt" Upchurch, the DMSO liaison for all HLA User Groups, at (703) 578-5726 or [rupchurch@aegisrc.com](mailto:rupchurch@aegisrc.com).

HLA User Groups have formed in Boston, the Tennessee Valley (Huntsville, Ala.), the Florida High Tech Corridor (Orlando, Fla.), and the Washington DC area. User Groups are also currently being formed in Colorado Springs and San Diego. Points of contact for the groups are as follows:

- **Tennessee Valley HLA UG:** John Innes (256) 922-0802 or [jimmes@aegisrc.com](mailto:jimmes@aegisrc.com)
- **Florida High Tech Corridor HLA UG:** Mike Lightner (407) 380-5001 Ext. 12 or [mlightner@aegisrc.com](mailto:mlightner@aegisrc.com)
- **Washington DC:** Robert Upchurch at (703) 578-5726 or [rupchurch@aegisrc.com](mailto:rupchurch@aegisrc.com)
- **Boston HLA UG:** Brian Spaulding (617) 876-8085 Ext. 112
- **Colorado Springs HLA UG:** Charlotte Scharer at (719) 567-9254
- **San Diego HLA UG:** Katherine Morse at (858) 826-5442 or [katherine.l.morse@saic.com](mailto:katherine.l.morse@saic.com)

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## ***Environment Federation Project Marries HLA, SEDRIS***

By Marnie Salisbury  
DMSO HLA Cadre

The Environment Federation is a project designed to blend the benefits of the High Level Architecture (HLA) and Synthetic Environment Data Representation and Interchange Specification (SEDRIS) technologies. The intent is to use the SEDRIS Data Representation Model and the SEDRIS Data Coding Standard as the basis for the federation object model (FOM) for a federation comprising a combat simulation and a set of environment simulations, including dynamic meteorologic, oceanographic and terrain data.

Although the SEDRIS was originally conceived to solve the expensive data translation and correlation problems plaguing environment database interchange for simulation initialization, it makes sense to expand its use to run-time data exchanges as well.

Dr. Paul A. Birkel, a primary contributor to the SEDRIS and co-leader of the Environment Federation, said, "SEDRIS should become the 'lingua franca' for data exchanges of environment data of all types

— regardless of source or destination. We've put a lot of effort into making sure that the SEDRIS Data Representation Model and Data Coding Standard are complete and accurate. People shouldn't be out there having to make up their own terms for environmental data. (The) SEDRIS puts in place a solid foundation supporting environmental interoperability throughout the simulation lifecycle."

The federation comprises the JointSAF combat simulation, the ModStealth three-dimensional viewer, the Environment Data Server (EDS) [formerly known as the TAOS Distributor], and the Dynamic Terrain simulation. Both the EDS and the Dynamic Terrain simulation were originally developed under the Defense Advanced Research Projects Agency's (DARPA) Synthetic Theater of War (STOW) program. All of these federates previously operated in the STOW

See *ENVIRO FED*, p. 8

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# September release of RTI 1.3NG marks first commercially developed, formally verified RTI

By Chris Turrell  
DMSO HLA Staff

The September release of RTI 1.3NG (Next Generation) marks the first commercially developed and formally verified High Level Architecture (HLA) Runtime Infrastructure (RTI) available to the modeling and simulation (M&S) community. RTI 1.3NG implements the HLA 1.3 Interface Specification and will be made freely available through the Defense Modeling and Simulation Office (DMSO) Software Distribution Center online at <http://hla.dmsomil>.

The strategy followed in the release of this RTI varies from previous releases in several respects and is worthy of note. RTI 1.3NG will be released with all of its core ports available. These include support for Sun Solaris, Windows NT, Linux Red Hat, SGI IRIX, and VxWorks. The core ports were selected based on the download statistics for RTI 1.3 and address approximately 95% of the community's requirements. Additional details are available on the DMSO Software Distribution Center Web site. Additional ports may be requested through the HLA Help Desk at [hla@dmsomil](mailto:hla@dmsomil). Added ports are being developed in partnership with users having platform needs beyond the broad user population supported by the core ports.

In addition to a full release of core ports, RTI 1.3NG underwent a rigorous beta test process executed by current users of the 1.3 Specification. It was delivered on schedule to the DMSO in December. In January, a formal beta test program was initiated and current users of the 1.3 Specification were invited to participate in the process. The first beta period ended in April and the second beta period, targeting specific functionality, including Save and Restore, MOM, Time Management and Data Distribution Management, began in May. At the same time, participants in the original government RTI development team (MITRE) were developing the RTI Verifier tool (discussed in the companion article below). The two programs were synchronized to the extent necessary to complement one another's development.

Here's how it worked in practice. As the various RTI service areas were completed, they were submitted to the verifier team for testing. Deficiencies were then reviewed from three perspectives. These included the 1.3 Interface Specification, the verifier itself and the RTI implementation. This process, then, reinforced the soundness of the specification, and contributed to the development of a robust RTI implementation and verification process. In accordance with the verification policy, RTI 1.3NG made a "clean" run

through the verifier one last time, before it was certified for release.

Another important aspect of this program's development is the issue of performance. As pointed out recently by one of the early adopters, "No one ever asks for poor performance," and 1.3NG is no exception – RTI 1.3NG meets or exceeds the performance levels needed by current HLA users and the performance achieved by RTI 1.3. Performance issues and the Performance Benchmarks were closely monitored during the development and testing of this RTI. To help frame discussions on RTI performance, the DMSO has sponsored, and will place in formal configuration management, the RTI Performance Benchmarks. These are made freely available with each RTI download from the Software Distribution Center.

A new tutorial, "Tools to Help Plan, Test and Configure Your Federation for Performance," will be presented during the Fall Simulation Interoperability Workshop (SIW) to be held in Orlando, Sept. 12-17, and at HLA Regional Training sessions. For an SIW schedule visit <http://siso.sc.ist.ucf.edu/siw/99Fall/index.htm>.

Additionally, a special SIW session on the RTI 1.3NG will be co-hosted by the Research, Development, and Engineering (RDE) and the Run Time Infrastructure and Communications (RTI&C) Forums on Wednesday, Sept. 15, 10:30 a.m.-1200 noon, in the Sanibel Room of the Holiday Inn.

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## DMSO developing means to offer RTI verification

By Dr. Richard Weatherly  
RTI Verification Project Leader

Just as federate developers can test their software for High Level Architecture (HLA) compliance now, HLA Runtime Infrastructure (RTI) developers will soon be able to do the same for their products. The Defense Modeling and Simulation Office (DMSO) is developing facilities and procedures to verify that RTIs meet all of the requirements of the HLA Interface Specification.

On Aug. 11, the DMSO announced a certification policy that states: "For the purposes of the U.S. DoD, the Director of DMSO will render, with technical advice from the RTI Verification Facility, the definitive judgement as to the compliance by an RTI implementation to the HLA Specification." The policy goes on to say that the purpose of verification is to "ensure all RTIs used by the DoD behave the same with respect to the Interface Specification." RTI verification gives HLA federation developers freedom to choose the appropriate RTI implementation to serve their needs without having to worry about differences in adherence to the HLA standard.

Verification is a two-level process. Level One is a test RTI developers can perform themselves. It helps them determine when their product is ready for the investment of time and resources required for Level Two testing. Level One tests demonstrate simple RTI capabilities in all

major areas of the Interface Specification. The approximately 20 Level One tests resemble recipes in a cookbook – they give step-by-step instructions and describe specific expected results. No special software is required for Level One testing – RTI developers can use the Test Federate or a similar manual interface to invoke the services and observe the responses.

With Level One testing behind them, candidate RTIs are ready for the exhaustive, automated, Level Two testing provided by the RTI Verification Facility. The Verification Facility combines a requirements database, a test program development environment and an automatic test administrator. For HLA Specification 1.3, the Facility has more than 1350 individual tests. When ready for Level Two testing, RTI developers send the software that would be used by a typical federate developer to the DMSO. Within the Facility, the RTI software will be attached to the verification system as if it were simply a small number of individual federates. No special access to the candidate RTI software is required. Once attached, the appropriate battery of tests can be applied.

The official policy, as briefed to the Architecture Management Group in August, will be posted on the HLA Web site at <http://hla.dmsomil/> by early September along with the Level One tests and a form where RTI developers can sign up their products for verification.

# "How much will it cost me to transition to HLA?"

By Chris Turrell  
DMSO HLA Staff

"How much will it cost to transition to the High Level Architecture (HLA)?" This is one of the most frequently asked questions by leaders and managers within the modeling and simulation (M&S) community today.

While the question itself is reasonably straight forward, the answer is somewhat more complicated and elusive. The answer depends on a number of disparate factors and often there is no single right answer. Initially, the issue of cost to transition was clouded by a lack of data. Federates were just beginning to adopt the HLA and the sample size was quite small.

In January, with a small but growing base of HLA compliant federates, the Defense Modeling and Simulation Office (DMSO) implemented a program designed to help address the issue of HLA transition costs. The idea was to conduct an After Action Review interview with the development team for each federate that completed HLA compliance testing. The interview questionnaire provides an opportunity for comment on the compliance testing process and asks the respondent to provide an overall level of effort, in staff months, required for the transition. This level of effort information is then further characterized by identifying the HLA migration strategy used, the technical approach

used to develop the RTI interface and both HLA and non-HLA related tasks performed in the process of becoming compliant. Information on levels of experience, outside support and access to specialized training is also requested in an effort to further qualify the responses.

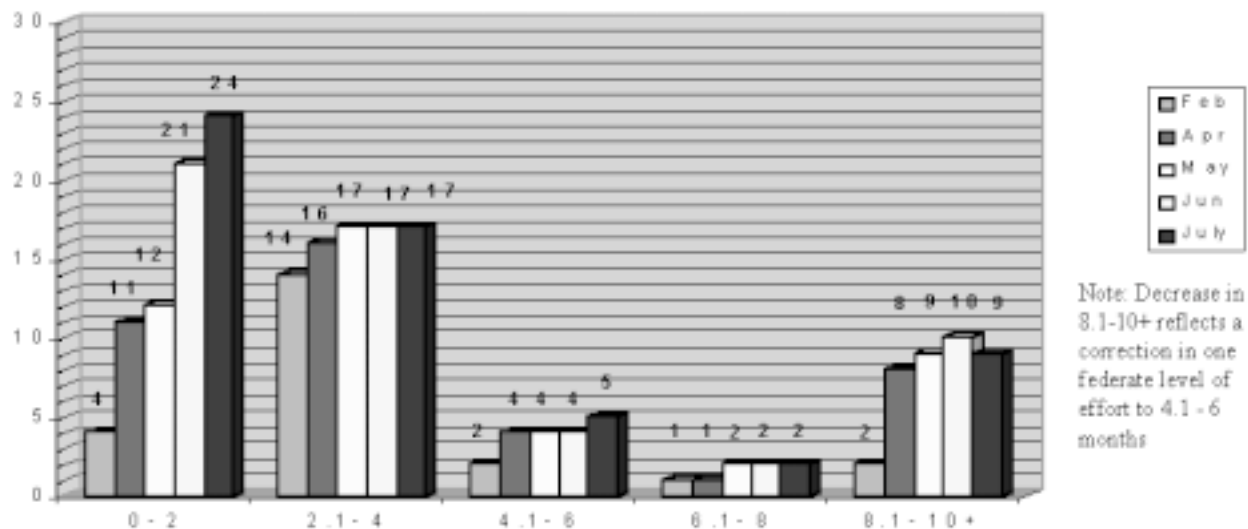
Using this process, the following data has been collected in the first seven months of 1999.

Some of the variation in the statistics can be attributed to things beyond the scope of HLA transition. For example, it is not unusual for a program transitioning to the HLA to also undertake other tasks at the same time. These tasks might include hardware upgrades, operating system upgrades, simulation capability updates and ports to new programming languages.

Simulations in the process of transitioning to the HLA have a number of alternative approaches to consider. Government-off-the-shelf (GOTS) and commercially-available-off-the-shelf (COTS) middleware and gateway products are available for consideration. Each alternative has pros and cons to be considered, and in the final analysis programs will have to make the decision based on the cost, schedule and risk factors of their situation.

For more information visit the HLA Web site at <http://hla.dmsi.mil>, or e-mail the HLA Help Desk at [hla@msis.dmsi.mil](mailto:hla@msis.dmsi.mil).

## Levels of Effort in Staff Months As of July 31, 1999



	Feb	Apr	May	Jun	1999 July
Maximum Staff Months Reported:	21	21	21	21	21
Minimum Staff Months Reported:	0.50	0	0.1	0.1	0.1
Median of Staff Months:	3.25	3.2	3	3.0	3
Average Staff Months per Federate:	3.8	4.6	4	3.9	3.8
Standard Deviation of Staff Months:	2.4	4.3	4	4.2	4.1

As of 7/30/99

## CMMS Data Dictionary

### CMMS-DD broadly applicable to many groups

By Bruce A. Harris

CMMS Data Dictionary Program Manager

and

Ron Smits

CMMS Data Dictionary Project Engineer

In an ongoing effort to provide the modeling and simulation (M&S) community with a comprehensive suite of tools, the Defense Modeling and Simulation Office (DMSO) is developing the Conceptual Models of the Mission Space (CMMS) Data Dictionary (DD). After a careful review that reconfirmed its potential as a key resource for mission space developers, the CMMS-DD data model has been defined. The proposed model combines elements of multiple organizational schemas into a three-dimensional framework, providing a doctrinally consistent representation of semantics used in the warfighter's domains.

The CMMS-DD is broadly applicable to many potential user groups, ranging from knowledge acquisition specialists to software engineers. Linguistic ambiguity present in warfighter semantics needs to be removed for synthetic representations of the military mission space. The use of authoritative and consistent term-description combinations can assist in reducing the confusion created

by the use of natural language descriptions. When term-description combinations are uniquely catalogued into the CMMS-DD, the use of these terms in formalized descriptions of the warfighter's mission space will reduce the potential for misunderstanding by knowledge and software engineers, as well as other users of the resource. The three-dimensional data model was designed after data categorization methods were examined.

Taxonomies and ontologies are common methods for data categorization and the exchange of domain knowledge. A primary distinction between taxonomy and ontology appears to be the conceptualization of the organizing classes or hierarchy. A taxonomy typically resembles a tree structure of progressively more detailed classes. Within each branch a commonality, explicitly defined, exists, but instance data is placed at the lowest possible sub-class, consistent with the defining characteristics of the branches and sub-classes. A taxonomy is a hierarchy of concepts. In examining an ontology, the relationships between the classes and concepts that define the organizational structure appear of more

See CMMS-DD, p. 17

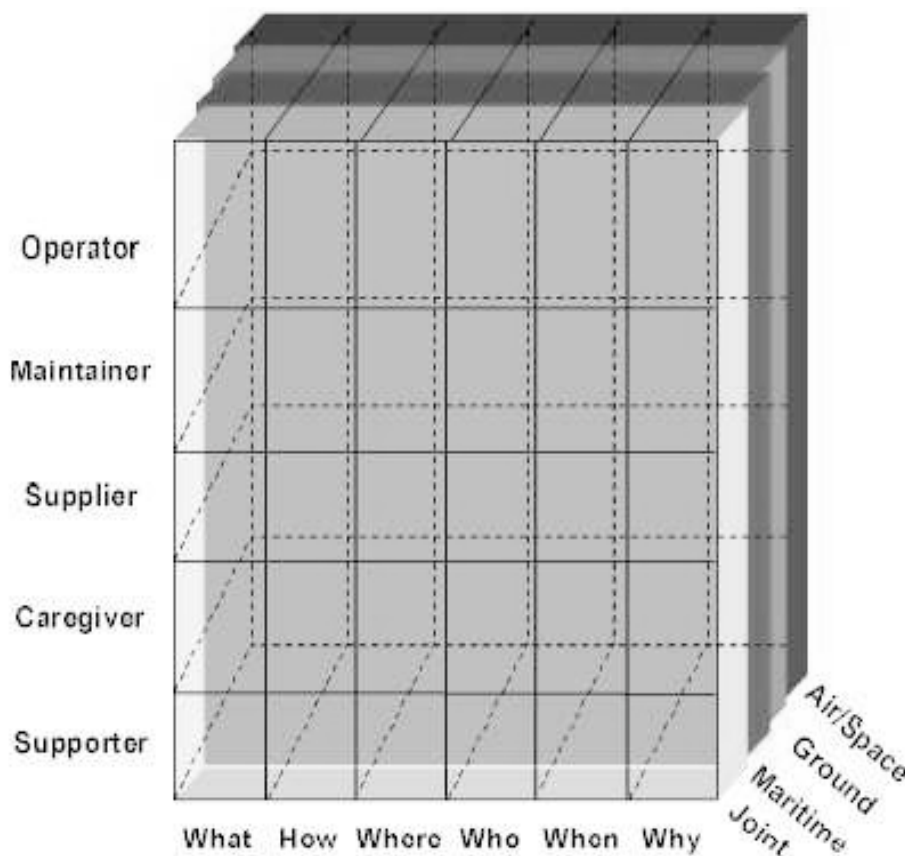


Figure 1. CMMS-DD Data Model



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# Army, Marines to test UOB Toolset in MEL 4-level education programs at Leavenworth, Quantico

By Furman Haddix, Ph.D.  
UOB Technical Lead

The Unit Order of Battle (UOB) Toolset has reached a point in maturity where it is appropriate to develop and implement a long-term strategy and information plan for its broader use in the Joint and Service communities. Given the conventional wisdom of “train as you will fight,” the potential audience for the UOB Toolset – beyond its current proponents in the modeling and simulation (M&S) user community – lies in both the military education system and field operating units.

The Joint Professional Military Education System, as well as the Service educational programs, devotes considerable time to operations and planning tasks. Joint and Service doctrine identifies well-defined staff processes for both deliberate and crisis action planning and these processes are imbedded in the curriculum of every level of school. Commonly referred to as the Estimate Process, this effort is necessarily time consuming and data focused. While future commanders and staff officers are often adept at analysis at lower levels of command and are able to develop task organizations to support specific courses of action (COAs), activities at the operational and strategic levels of war are usually Joint and combined, involving allies and non-governmental organizations. At that level unfamiliar organizational structures and dissimilar manning and equipment tables can make

planning extremely challenging for commanders and staff, the UOB Toolset could be the solution to this problem by substantially reducing the time required to extract and develop a task organization. The Toolset allows quicker responses to crises and/or more time to analyze the results, potentially translating into lives saved.

An FY 99 analysis comparing existing force structure and operational planning tools with emerging Joint and Service operational strategies and doctrine – Joint Vision 2010, Concept for Future Joint Operations and complementary Service strategies – provided the basis for expanding the capability of the Toolset. The Army and Marine Corps will test the Toolset in their educational systems at Military Education Level 4 (captains and majors) at Fort Leavenworth, Kan. and Quantico, Va., respectively. Following the “train as you will fight” wisdom, students will have the opportunity to carry the same tool they used in the classroom to their field units for real-world operational and strategic planning.

## Task Organizing Simplified

The UOB Toolset consists of three main components: a library of UOB authoritative data sources (UOB ADS), a data extraction tool

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## CMMS-DD

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importance. Ontology is an explicit and precise description of concepts and relations that exists in a particular domain such as a given organization, a study field, or an application area.

Several leading theories on knowledge storage and exchange were examined, ranging from Dr. Mike Fineberg's Conceptual Model of Human Behavior (CMHB) to IDEF5, a formal ontology capture language. Additionally, enterprise modeling techniques were studied, such as Thomas Gruber's work at the Knowledge Sharing Laboratory of Stanford University, and John Zachman's Enterprise Architecture. Many organizational schemas are applicable to the CMMS-DD.

There is no shortage of class organization and definition schemas within the military domain. From the Unified Joint Task List (UJTL) to the Common Semantics and Syntax (CSS), or from the Authoritative Data Source (ADS) to the CMHB taxonomy, agreement on a “standard” M&S taxonomy is difficult to obtain. Programs develop taxonomies freely to structure their data. While these structures may not have applicability to larger, outside or cross-domain users, they tend to represent the common view held within the domain of the producer of the resource or repository. This domain view would presumably represent

the data needs of the internal users, who could benefit from access to other data sources structured similarly. The likelihood of a single, universally applicable, taxonomy was discounted for the CMMS-DD, as multiple taxonomies presently exist that accommodate individual program needs. The CMMS-DD needs to accommodate these multiple perspectives.

When the requirements for data exchange to promote model use and reuse are examined in an effort to increase interoperability and reduce cost, an ontological approach appears to offer advantages as a conceptualization of the military domain. The construction of an “enterprise” ontology that establishes “mandatory” term-definition combinations unique to a military enterprise is, perhaps unfortunately, unrealistic presently. The military domain is filled with linguistic ambiguity. While the goal to establish unique semantics for a Joint ontology is noble, the reality of Service doctrine and warfighter M&S needs make that goal unattainable. Precise domain conceptualizations are nevertheless necessary to communicate across the different domains, if one is to achieve the goals of interoperability, reuse, unambiguous information, and reliability.

The M&S community is interested in not only the specific military domain, but the entity and its activities within the domain as well. While similar terms may be used,

information modeling for logistic support is different from the information needed to support the execution of Close Air Support.

The three-dimensional data model for the CMMS-DD categorizes term-description combinations based on four required attributes: Focus, Domain, Participant and Part-of-Speech. The possible attribute values are doctrinally consistent with current military practices and offer the opportunity to uniquely categorize the necessary term-description combinations in a relational database. A Multiple Taxonomy Browser, such as the DMSO partner program *Eurisko*, can then access the database to present the stored data consistent with user expectations. Mapping to existing taxonomies can be accomplished by identifying CMMS-DD attribute value combinations that represent the sought-after relations and linkages.

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# CMMS enters fourth development cycle

By Tom Johnson

CMMS Toolset Project Manager

The Defense Modeling and Simulation Office (DMSO)-sponsored Conceptual Models of the Mission Space (CMMS) Toolset Project recently completed its third six-month development cycle and is set to begin Cycle 4.

The CMMS provides an evolvable and accessible framework of tools and resources for conceptual analysis for areas such as conventional combat operations, other military operations, training, acquisition and analysis in the form of mission space models. The CMMS mission space structure, tools and resources provide both an overarching framework and access to the necessary data and detail to permit development of consistent, interoperable, and authoritative representations of the environment, systems and human behavior in DoD simulation systems.

During Cycle 4, CMMS development will focus on the implementation of the CMMS Data Interchange Format (DIF). The DIF represents a set of structured semantics and syntax of the physical representation of mission space data. Much of the effort in the preceding development cycles has been directed toward development of functionality which will satisfy the immediate needs of large programs, such as JWARS and JSIMS, where the CMMS program emphasis was on capturing data repository content. With Cycle 4, the emphasis changes toward satisfying the long-term needs of a larger and more diverse group of users, including the current users.

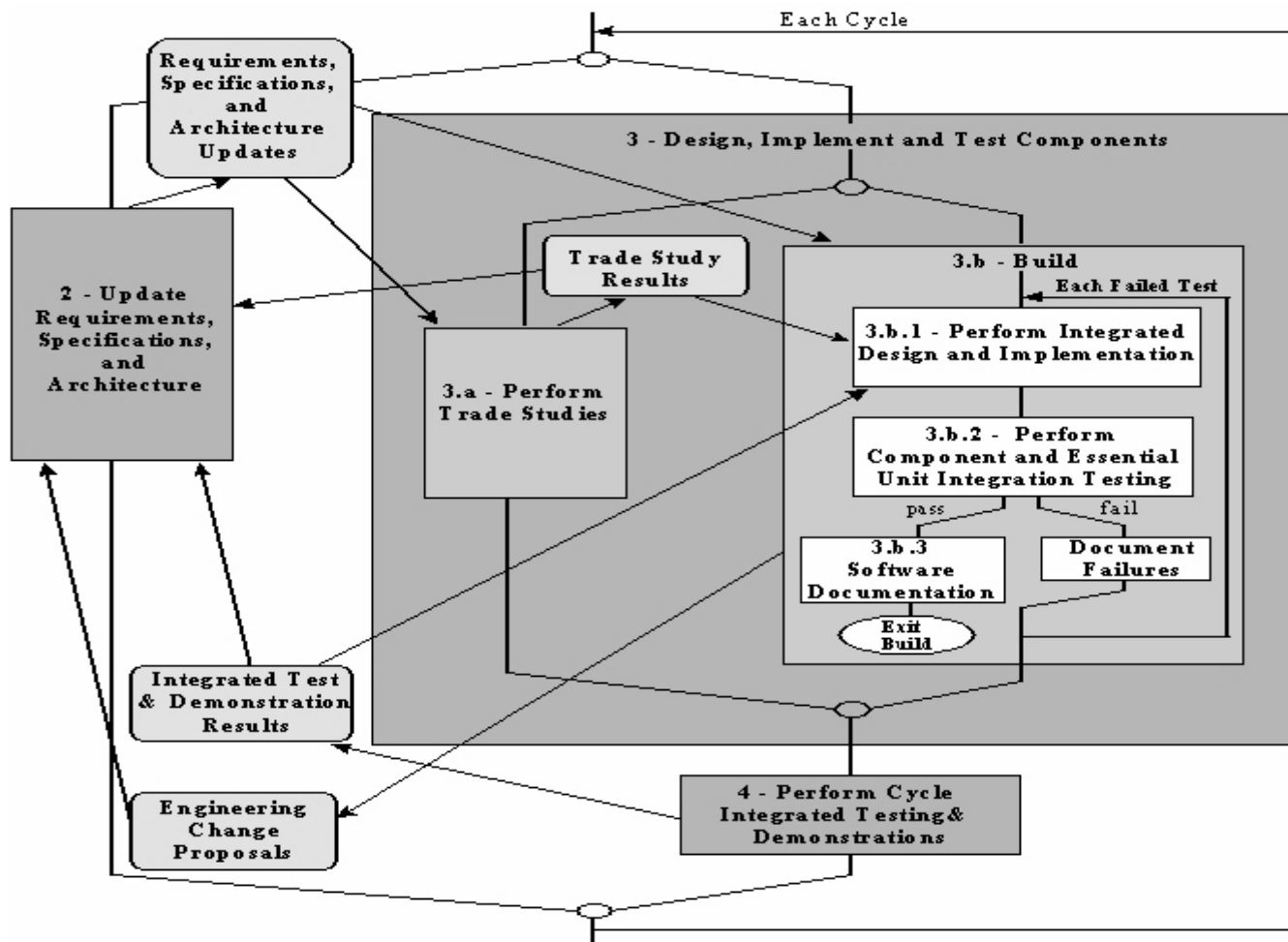
Utility of the DIF derives from many features, including:

- Use of XML provides a target data structure for multiple developers based on an established standard with the concomitant benefits of commercial-off-the-shelf (COTS) parsers and editors.
- The refined data structure of the DIF, building on experiences with many knowledge acquisition/engineering programs provides a capacity suitable for transfer of the products of diverse knowledge development processes.
- The modular approach used in DIF articulation allows the user to concentrate on only those parts of the DIF and related documentation appropriate for his application.
- The capacity of the DIF to deal with data transfers between receiving and sending data systems facilitates the reuse of knowledge across a wide range of users.
- The identification of explicit transfer purpose with respect to elements of a DIF instance reduces the possibility for misapplication of transferred data by the receiving data system.

Cycle 4 development will produce a CMMS Toolset with utility for a wider user audience, with specific implications for software developers.

The CMMS represents a common starting point for constructing consistent and authoritative M&S representations, and facilitates the interoperability and reuse of simulation components. It is a simulation-neutral view of the real world, and acts as a bridging function between the warfighter, who owns the combat process and serves as

See CMMS 4TH CYCLE, p. 19



# ADS Library incorporates structures to support Intel community, VV&A process

By Dave Kendrick  
ADS Deputy Project Manager

The Authoritative Data Sources (ADS) Library continues to expand its holdings and their contents by reducing resource commitments to the knowledge acquisition processes that occur on a daily basis.

On the content front, one of the ADS Project's first actions was the development of a taxonomy to categorize the informational sources contained in the library. That initial taxonomy design was generic and intended for sources, whether they addressed U.S. or foreign information, to fall under the same taxonomy categories, e.g. a dataset that contained information on U.S. tank characteristics and one that contained Soviet tank characteristics would be found under the same taxonomy structure of "Equipment," sub-category "Equipment Characteristics," and sub-sub-category "Land."

The Defense Intelligence Agency (DIA) requested through the ADS Working Group (ADS WG) that the taxonomy be expanded to provide a definite division between U.S. and foreign information where applicable. A top level category of "Foreign Forces" was added with an appropriate selection of 57 sub-cat-

egories. Now an ADS user who is looking specifically for foreign information can focus his initial search appropriately. A search for the Soviet tank information in the example above would be conducted by running a taxonomy search on "Foreign Forces" with the succeeding levels of sub-categories of "Equipment," "Equipment Characteristics," and "Land." The taxonomy linkages of the existing resources have been updated.



The library has also expanded the metadata structures. This expansion was completed as a result of work done by the DoD Verification, Validation and Accreditation (VV&A) Working Group during development of the VV&A Recommended Practices Guide. Specifically, it recommended the metadata template be maintained by the producer and used by the end-users to conduct VV&A of a simulation. Representatives of the VV&A WG and the ADS WG reviewed the total template of metadata recommended and selected those top-level elements for incorporation into the ADS. The structure now allows for the addition of information in the areas of quality, original sources, use and distribution. This will assist the user select a source not only by its appropriateness for his needs but with the knowledge that he will be able to easily conduct his VV&A.

On the Expansion Front. During the last six months the ADS Project has been focusing metadata collection efforts in the area of Human Behaviors (HB) information. Over 300 studies, papers and datasets have been identified and collection of the metadata associated with them continues. Report any HB sources or any knowledge sources that would be of value to the ADS project representatives below so they can be included in the library.

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## UOB Toolset

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(UOB DAT), and a data interchange format (UOB DIF). The library of sources consists of Foreign and U.S. Forces, Classified and Unclassified, and current and future force structures. UOB sources are maintained by the owning organizations and made available to the UOB DAT in their native formats to the maximum extent possible. The DAT features a graphical interface that allows users to retrieve and browse order of battle data and associated information and select individual units easily and quickly across distributed networks. Selected units can be task organized, aggregated/deaggregated to desired unit levels, and unit attributes edited and used as start up data in models, simulations, and the operational, planning, training and execution systems. The DIF presents UOB information from all library sources in a single, understandable, consistent, standard format readily available over distributed networks. The DIF is based on DoD standards and users can depend on this standard format for obtaining UOB for their interfaces to their models, simulations and other planning, training and acquisition systems.

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### DMSO M&S Awards

The nomination period is Oct. 1 through Dec. 10.

See p. 1 for more information, or visit the [www.dmsomil/awards/](http://www.dmsomil/awards/).



See p. 2 for instructions for receiving an e-mail version of the DMSO News each quarter.

## CMMS 4TH CYCLE

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the authoritative source for validating CMMS content, and simulation developers. Additionally, the CMMS provides a common viewpoint and serves as a vehicle for communications among warfighters, doctrine developers, trainers, C4I developers, analysts, and simulation developers. Such a foundation allows all concerned parties to be confident that DoD simulations are founded in operational realism.

CMMS information is available on the World Wide Web at <http://38.241.48.9/>, or contact:

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## Zimmerman new HLA Manager beginning Oct. 1



Photo by Steve Wilson

Philomena "Phil" Zimmerman will begin managing the High Level Architecture (HLA) technical program for the Defense Modeling and Simulation Office (DMSO) beginning Oct. 1.

Zimmerman has been involved in the distributed modeling and simulation (M&S) community since 1992, first with the Distributed Interactive Simulation (DIS) organization, and now with the Simulation Interoperability Standards Organization (SISO) and its Simulation Interoperability Standards Committee (SISC).

She began working with the HLA in the early days of the baseline definition as part of the protofederation effort, and has continued and expanded her role, first handling security issues for the HLA, and more recently as a member of the HLA Cadre effort, concentrating mainly in Test and Evaluation efforts.

As the manager, she will be responsible for the day-to-day oversight of the program, and other duties within the DMSO related to HLA development, testing and implementation. Dr. Judith Dahmann, Chief Scientist, who had been responsible for the HLA program, will be focus her attentions on a broader set of DMSO responsibilities, including the new DMSO program and plans integration activities.

Zimmerman will be on loan from the Naval Air Systems Command (NAVAIR) during the assignment.

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## MSIAC completes 2 month transition, fully operational

By Marc Erlandson  
MSIAC Operations Manager

The Modeling and Simulation Information Analysis Center (MSIAC) has completed its two-month transition and is fully operational.

Formed on June 1, the DoD's newest IAC is the single integrated support activity dedicated to providing expert scientific, technical and operational support to modeling and simulation (M&S) developers and users. The MSIAC merged the functions of the Modeling and Simulation Operational Support Activity (MSOSA), the M&S functions of the Defense Modeling and Simulation and Tactical Technology Information Analysis Center (DMSTTIAC), the operational functions of the Modeling and Simulation Resource Repository (MSRR), and other critical support functions previously conducted in separate programs. The Defense Technical Information Center (DTIC) and the Defense Modeling and Simulation Office (DMSO) co-sponsor the MSIAC.



The MSIAC Help Desk replaces the MSOSA Help Desk as the "first place" to turn for information, expert advice, and answers to specific M&S-related questions. Other M&S community support services formerly provided by the MSOSA through the Internet and Secret Internet Protocol Router Network (SIPRNet), such as the M&S Calendar and Special Interest Areas, are now provided by the MSIAC. Beyond these free services, MSIAC provides a Technical Area Task (TAT) system that allows a selected team of defense contractors to provide readily accessible task order support on a fee-for-service basis. The following categories of support can be provided as MSIAC TATs:

- operational support services
- M&S scientific and technical analysis
- M&S education and training
- M&S employment assistance
- technical management support to M&S resource repositories
- software and document distribution
- M&S conference support
- VV&A technical assistance
- HLA compliance testing
- simulation impact assessments
- dedicated support tasks
- communication requirements definition and service allocation

For a fuller description of MSIAC services, visit the MSIAC Web site at <http://www.msiac.dmsomil/>, or the MSIAC demonstration kiosk at the Fall Simulation Interoperability Workshop.

To reach the MSIAC Help Desk, call (703) 933-3323 or toll free in the Continental U.S. at (888) 566-7672. International toll free numbers for several foreign countries and the SIPRNet address are listed on the MSIAC Web site. Send e-mail requests for assistance to [msiachelps@msiac.dmsomil/](mailto:msiachelps@msiac.dmsomil/).